

ABSTRACT

An efficient and reconfigurable permanent magnet generator that comprises a permanent magnet subassembly and at least one exciter is disclosed. The permanent magnet generator may comprise a mainframe comprising at least one exciter, and a permanent magnet subassembly comprising a plurality of magnets that are arranged to form at least one air gap between facing magnetic poles in which the at least one exciter resides and that are reconfigurable for alternating current or direct current operation by inversion of respective magnetic poles. The at least one exciter may comprise a plurality of alternating layers of a first material and a second material, where the first material may comprise a superconductive material and the second material may comprise a non-superconductive material, and wherein the layers of the superconductive material are thin relative to the thickness of the layers of the non-superconductive material. A method for generating electric energy using a reconfigurable permanent magnet generator is also disclosed. The method comprises selecting an alternating current or a direct current generation mode; configuring at least one reconfigurable magnet to correspond with the selected generation mode; disposing at least one exciter in an air gap defined by the at least one reconfigurable magnet; and rotating the at least one reconfigurable magnet relative to the at least one exciter. The disclosed generator may thus produce either alternating current (AC) or direct current (DC) using alternative configurations of the same mechanical components.